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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/589,460

01/12/2007

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EXAMINER

TRAN, KHANH C

ART UNIT

PAPER NUMBER

2611

NOTIFICATION DATE

DELIVERY MODE

04/14/2010

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/589,460	Applicant(s) ITO ET AL.	
	Examiner KHANH C. TRAN	Art Unit 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-129 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 41,42,83,84,125 and 126 is/are allowed.
- 6) ☒ Claim(s) 3,40,43-45,82,85-87,124 and 127-129 is/are rejected.
- 7) ☒ Claim(s) 4-39,46-81 and 88-123 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 January 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The Preliminary Amendment filed 8/14/2006 has been entered. Claims 3-129 are still pending in this Office action.

Claim Objections

2. Claim 17 is objected to because of the following informalities: in lines 3-4, "in the M stages" should be changed to -- in M stages --. Appropriate correction is required.

3. Claim 59 is objected to because of the following informalities: in lines 3-4, "in the M stages" should be changed to -- in M stages --. Appropriate correction is required.

4. Claim 100 is objected to because of the following informalities: claim **does not depend on any previous claims**. Appropriate correction is required.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 127-129 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 127-129 fail to fall within a

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statutory category of invention. Claims are directed to a program per se, not a process occurring as a result of executing the program, a machine programmed to operate in accordance with the program nor a manufactures structurally and functionally interconnected with the program in a manner which enables the program to act as a computer component and realize its functionality. Claims are not directed to a composition of matter. Therefore, it's non-statutory under 35 U.S.C 101.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 3, 43-45, 85-87 and 127-129 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bjerke et al. U.S. Patent 7,154,936 B2.

Regarding claim 3, Bjerke et al. discloses a wireless communication system for receiving and demodulating transmitted signals from a transmitting apparatus having M (M is an integer of 2 or greater) transmission antennas, with a receiving apparatus having N (N is an integer of 2 or greater) (see Bjerke et al. FIG. 1),

Bjerke et al. does not expressly disclose “*means for performing nulling representative of orthogonalization of the received signals, using a channel matrix having as elements channel coefficients between said reception antennas and said*

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transmission antennas; and means for outputting a likelihood for bits of said transmitted signals based on the nulled signals”.

Bjerke et al. discloses means for performing nulling representative of orthogonalization of the received signals, using a channel matrix having as elements channel coefficients between said reception antennas and said transmission antennas (the use of interference nulling to isolate each transmitted signal by removing the other interferers and the use of a "dual-maxima" or some other approximation to compute the LLRs (log-likelihood ratios); see column 2 lines 42-50 and see also FIG. 4C.

Furthermore, because Bjerke et al. teachings apply to MIMO-OFDM, the nulling representative of orthogonization as claimed. The channel matrix having as elements channel coefficients between said reception antennas and said transmission antennas is described in equation 3; see column 13 lines 35-55).

Because Bjerke et al. discloses the claimed step of performing nulling, therefore, one of ordinary skill in the art at the time the invention was made would have recognized that the mobile station, as taught in Bjerke et al. invention, has an equivalent means for performing the recited step; and

means for outputting a likelihood for bits of said transmitted signals based on the nulled signals (see Bjerke et al. FIG. 4C embodiment, i.e. decoded bits).

Regarding claim 43, claim is rejected on the same ground as for claim 3 because of similar scope. Furthermore, decoders 440a – 440t perform the step of demodulating the transmitted signals after applying interference nulling.

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Regarding claim 44, claim is rejected on the same ground as for claim 3 because of similar scope.

Regarding claim 45, claim is rejected on the same ground as for claim 3 because of similar scope.

Regarding claim 85, claim is rejected on the same ground as for claim 43 because of similar scope.

Regarding claim 86, claim is rejected on the same ground as for claim 44 because of similar scope.

Regarding claim 87, claim is rejected on the same ground as for claim 45 because of similar scope.

Regarding claim 127, claim is rejected on the same ground as for claim 43 because of similar scope. Bjerke et al. discloses controllers 130 and 170 direct the operation at the transmitter and receiver systems, respectively. Memories 132 and 172 provide storage for program codes and data used by controllers 130 and 170, respectively (see column 4 lines 57-62).

Regarding claim 128, claim is rejected on the same ground as for claim 44 because of similar scope. Bjerke et al. discloses controllers 130 and 170 direct the operation at the transmitter and receiver systems, respectively. Memories 132 and 172 provide storage for program codes and data used by controllers 130 and 170, respectively (see column 4 lines 57-62).

Regarding claim 129, claim is rejected on the same ground as for claim 45 because of similar scope. Bjerke et al. discloses controllers 130 and 170 direct the operation at the transmitter and receiver systems, respectively. Memories 132 and 172 provide storage for program codes and data used by controllers 130 and 170, respectively (see column 4 lines 57-62).

7. Claims 40, 82 and 124 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami U.S. Patent 7,280,840 B2.

Regarding claim 40, Murakami discloses a wireless communication system for receiving and demodulating transmitted signals from a transmitting apparatus having M (M is an integer of 2 or greater) transmission antennas, with a receiving apparatus having N (N is an integer of 2 or greater) (see Murakami FIG. 7),

Murakami does not, however, expressly disclose means for using a Euclidian distance as set forth in the application claim.

In column 51 lines 17-35, Murakami discloses using Euclidian distance converted by performing a given processing operation on a squared Euclidian distance

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(combination, weighting and combining the Euclidian distances, corresponding to the step of processing operation on a squared Euclidian distance, between reception points of modulated signals separated in each combination and candidate points using the channel fluctuation matrix eigenvalues used at the time of separation, and taking the candidate signal point for which the Euclidian distance is smallest as a reception point, taking smallest Euclidian distance, corresponding to the Euclidian distance converted; see column 51 lines 17-35). In view of that, because Murakami teaches the step of using Euclidian distance converted, therefore, one of ordinary skill in the art at the time the invention was made would have recognized that Murakami teachings have equivalent means for using a Euclidean distance converted by performing a given processing operation on a squared Euclidean distance as claimed.

Regarding claim 82, claim is rejected on the same ground as for claim 40 because of similar scope.

Regarding claim 124, claim is rejected on the same ground as for claim 40 because of similar scope.

Allowable Subject Matter

7. Claims 4-39, 46-81, 88-99 and 101-123 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. Claims 41-42, 83-84 and 125-126 are allowed.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kishigami et al. U.S. 7,088,956 B2.

Kim U.S. Patent Application Publication No. US 2007/0104163 A1.

Kim et al. U.S. Patent Application Publication No. US 2004/0141566 A1.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KHANH C. TRAN whose telephone number is (571)272-3007. The examiner can normally be reached on Monday - Friday from 08:00 AM - 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on 571-272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KCT

***/KHANH C. TRAN/
Primary Examiner, Art Unit 2611***